Coldest January since 2010, but not exceptional by historical standards

Description

January, with an average temperature of 2.2 °C, has been the coldest January across the UK since 2010. In that year the average UK January temperature was 0.9 °C; the coldest January on record was 1963 with a mean temperature of -1.9 °C. It has also been the coldest calendar month since March 2013 which also recorded an average temperature of 2.2 °C.

Dr Mark McCarthy is the head of the Met Office's National Climate Information Centre (NCIC). He said: "January 2021 has been dominated by colder-than-average weather with only brief milder interludes, but what does this cold winter mean in the context of climate change and a warming planet? Well, a winter month as cold or colder than January 2021 used to occur in approximately seven out of ten winters through the 20th Century. In more recent decades this has dropped to around three in ten. So although we are still subject to cold weather in winter, these cold spells tend not to be as severe or as frequent as in the past."

	Maximum temperature		**Minimum temperature**	
Provisional January figures	**Actual °C**	**Difference from Jan average °C**	**Actual °C**	**D av**
UK	4.9	-1.5	-0.5	-1
England	5.7	-1.2	0.2	-1
Wales	5.9	-0.9	0.6	-0
Scotland	3.1	-2.1	-2.1	-2
Northern Ireland	5.8	-1.3	0.1	-1

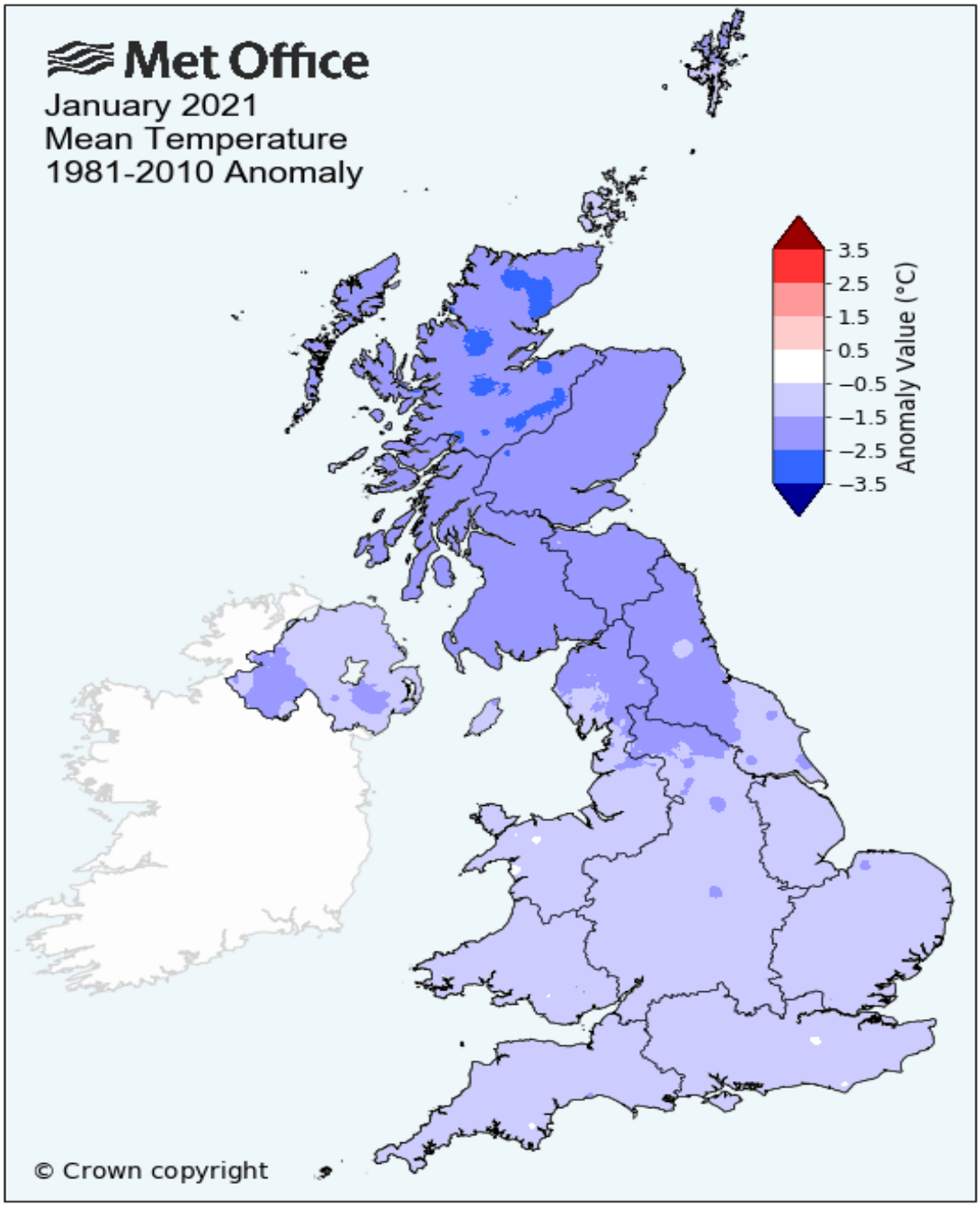


Figure 1: Mean temperature across the UK during January 2021

A recently published study by Met Office scientists has also shown that the likelihood of experiencing extreme high winter temperatures, such as those in February 2019, has increased substantially. Mark added: “Taken together the evidence from recent UK winters is consistent with the overall effect of climate change leading to milder winters, less frequent cold extremes, and higher winter temperature records for the UK.”

The Met Office temperature series dates back to 1884, and last month struggles to get into the 30 coldest UK Januarys.

The coldest part of the UK relative to normal was Scotland with the average January temperature

recording 0.6 °C. Tim Legg of the NCIC added: “A strong northerly flow was a main driver in bringing Scotland’s relatively low temperatures, but although they were the lowest on average since 2010, the northerly flow also brought substantial sunshine to Scotland for the time of year, marking a distinct contrast with England and Wales, which saw much less by comparison.”

	Sunshine	
Provisional January figures	**Actual sunshine in hours**	**% of the January average**
UK	44.7	95
England	42.5	78
Wales	34.4	71
Scotland	48.6	136
Northern Ireland	57.5	129

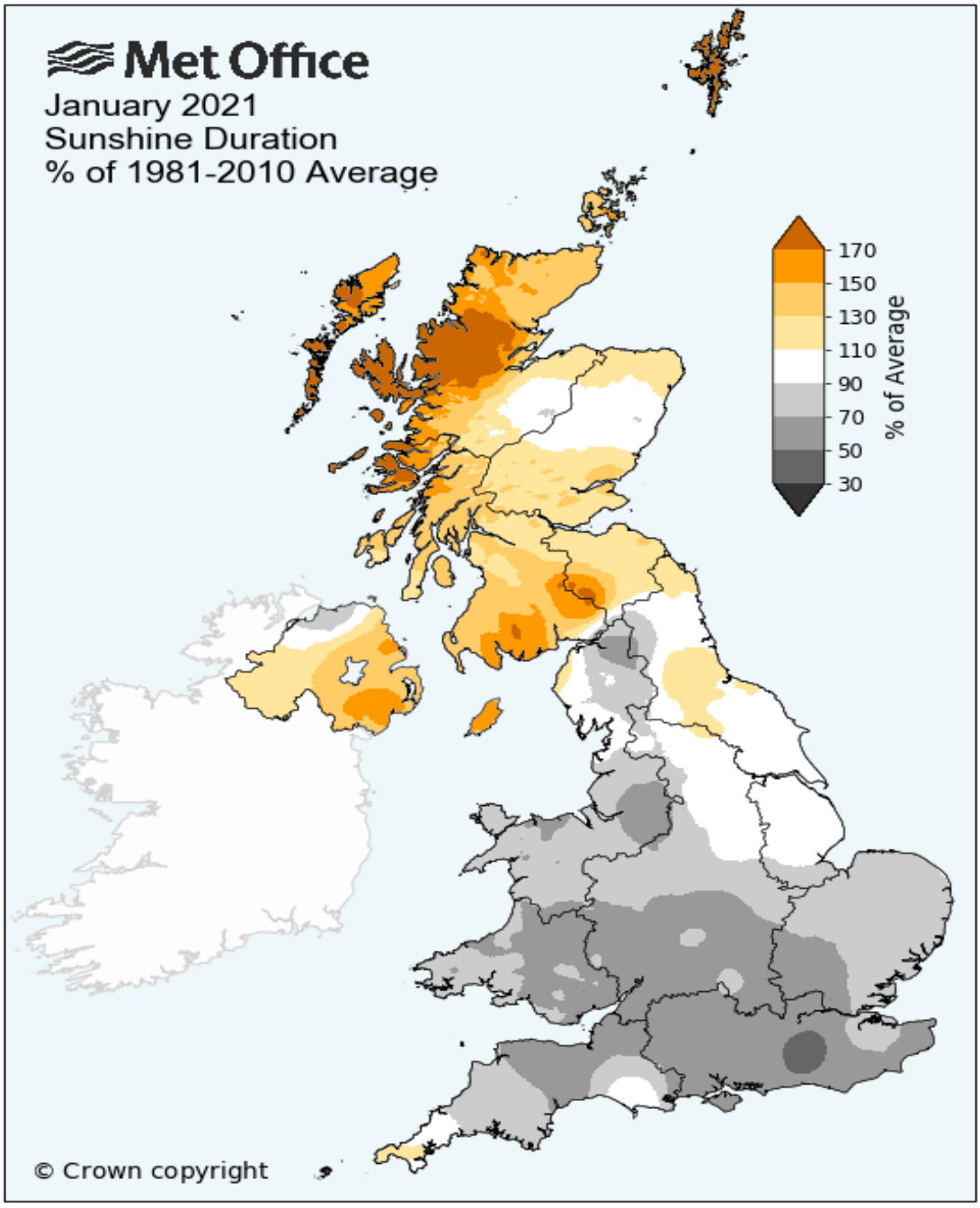


Figure 2: Sunshine duration across the UK during January 2021

With 48.6 hours of sunshine on average, January 2021 saw Scotland experiencing its fourth sunniest January since records began in 1919. By comparison south east and central southern England experienced on average 35 hours of actual sunshine during the month, which is about 60% of the sunshine recorded during a typical January.

Tim Legg said: “The differences in sunshine figures between the north and south of the UK during January are quite marked. During winter day length is longer in southern England than in Scotland, and that is usually reflected in the sunshine figures. But this January we have seen a marked difference with the hours of actual sunshine increasing from south to north.”

Precipitation

The combined totals of rain and snow across the UK reveal that January 2021 wasn't an exceptional month for the UK overall. But the UK figure does not represent the complete picture. Mark McCarthy added: "Several areas of England and Scotland saw more than double the amount of rainfall for a typical January, and Loftus in North Yorkshire had more than three times its normal January rainfall. Elsewhere East Lothian in Scotland and several East Midlands and north-western areas of England recorded double their average precipitation."

The wettest areas by amount of rain were in north Wales and north-west England, with in excess of 200 mm through the month, a significant proportion of which was rainfall associated with storm Christoph from 18th to 20th.

	Rainfall	
Provisional January figures	**Actual rainfall**	**% of the January average**
UK	136.6mm	113
England	124.0mm	150
Wales	208.4mm	133
Scotland	141.0mm	80
Northern Ireland	119.1mm	102

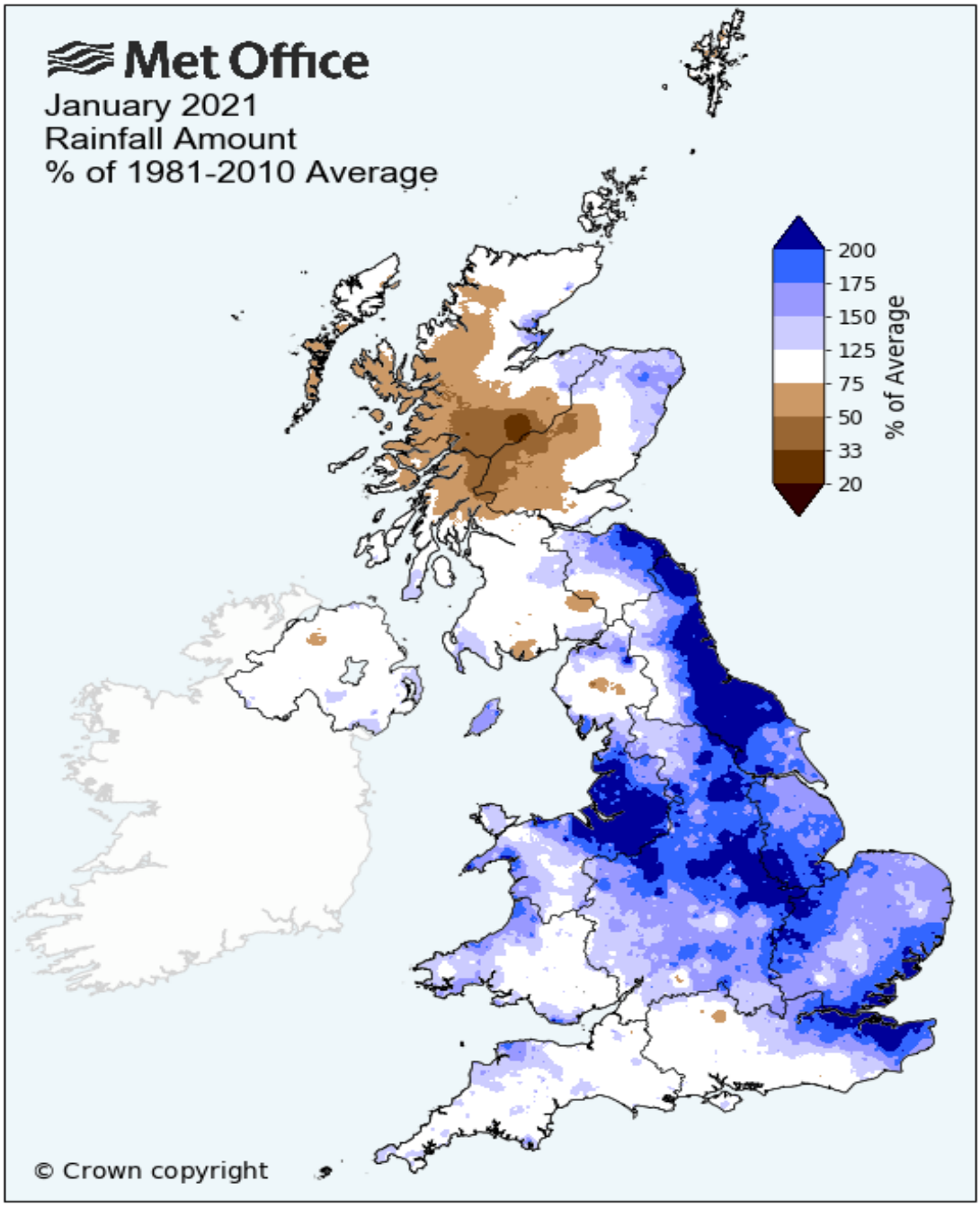


Figure 3: Precipitation (including rain and snow) across the UK during January 2021

Date Created
February 2021

Multiple drivers create challenges for forecasting weather direction

Description

How times change. This time last year, we were in the early days of a month which went on to become the wettest February for the UK in a series stretching back to 1862.

Storms Ciara, Dennis and Jorge, which swept in west from the Atlantic, brought a large proportion of the month's total rainfall on moisture-laden and relatively warm winds

So will February 2021 follow a similar pattern? Met Office weather presenter Aidan McGivern said: "What we have started with this month is a different pattern, especially in the north, with more of an easterly influence than one from the west, and there are several reasons for this, but the major factor is the strength of the westerly flow, which has and is being influenced by opposing climate drivers."

A key driver of winter weather in the UK and Western Europe is the North Atlantic Oscillation (NAO) – a measure of average atmospheric pressure difference between an area of high pressure near the Azores and the semi-resident low pressure between Iceland and Greenland. Aidan McGivern said: "This sounds complicated, but what you have to remember is that when the pressure difference is greater than average you have a so-called positive NAO which steers low-pressure systems toward the east across the Atlantic; a negative NAO slows down the flow, and can even reverse it completely by bringing the flow from the east. That is the prospect, a much colder prospect, that we see in the forecast for at least a few days from the weekend."

So as the NAO is a principal determinant of the UK's weather in winter, what drivers can affect the NAO? Aidan McGivern continued: "When meteorologists are trying to gain an insight into longer-term forecasts it is like trying to work out who is going to win a marathon. You can study the form of individual athletes but on the day any number of factors can determine the outcome: and, of course, the favourite doesn't always win because of the 'chaos' inherent within a sporting event, or the atmosphere."

In meteorological terms there are a number of influences that can affect the positive or current negative phase of the NAO and they can all play out at different timescales.

Atmospheric events even as far away as the tropical Pacific can exert an influence on the strength, shape and position of the jet stream and subsequently the NAO.

As this winter approached, La Niña – the cool phase of the El Niño Southern Oscillation – was taking place. La Niña has historically been linked to colder conditions during late autumn and early winter followed by increased rainfall and milder conditions during the second half of winter.

However, as winter progressed, it soon became apparent that other drivers would provide an opposing influence to La Niña and at shorter timescales.

Often a big driver for affecting the phase of the NAO is a Sudden Stratospheric Warming, where a

breakdown of the Stratospheric Polar Vortex (SPV) – a ring of westerly winds high up in the stratosphere – causes a disturbance and a potential reversal of direction which can influence the jet stream below, causing it kink and buckle. An SSW event in early January helped to disrupt the jet stream and contribute towards a south-shifted Atlantic storm track during recent weeks. The SPV has not yet recovered and so can still exert an influence.

The Madden-Julian Oscillation (MJO) is an eastward-moving phase of enhanced tropical rainfall that primarily affects the Indian and Pacific Oceans and occurs on weekly to monthly timescales. When rainfall is enhanced in the West Pacific, it has been shown to lead to weather patterns close to the UK that induce a greater chance of cold weather during winter. At the start of this week, the MJO moved into an active phase over the West Pacific. A strengthening high pressure block to the north of the UK during the next few days, helping to push the Atlantic storm track even further south and resulting in easterly winds, is consistent with what might be expected from this phase of the MJO.

Aidan concluded: “In recent years, meteorologists have become more aware of the many different influences on the UK’s winter weather – from the stratospheric polar vortex to rainfall patterns in the tropics. Some influences, such as La Niña, can be identified well ahead of the start of winter. Others, such as the MJO, operate on much shorter timescales. Add into the mix the inherent chaos of the weather and you’ve got all the ingredients for a particularly challenging forecast.”

Paul Davies is the Met Office’s Chief Meteorologist and he has the ultimate responsibility for production of the forecast. He said: “Our team of meteorologists have the complex task of producing a forecast taking into account not only the global drivers, but also looking at effects closer to home.

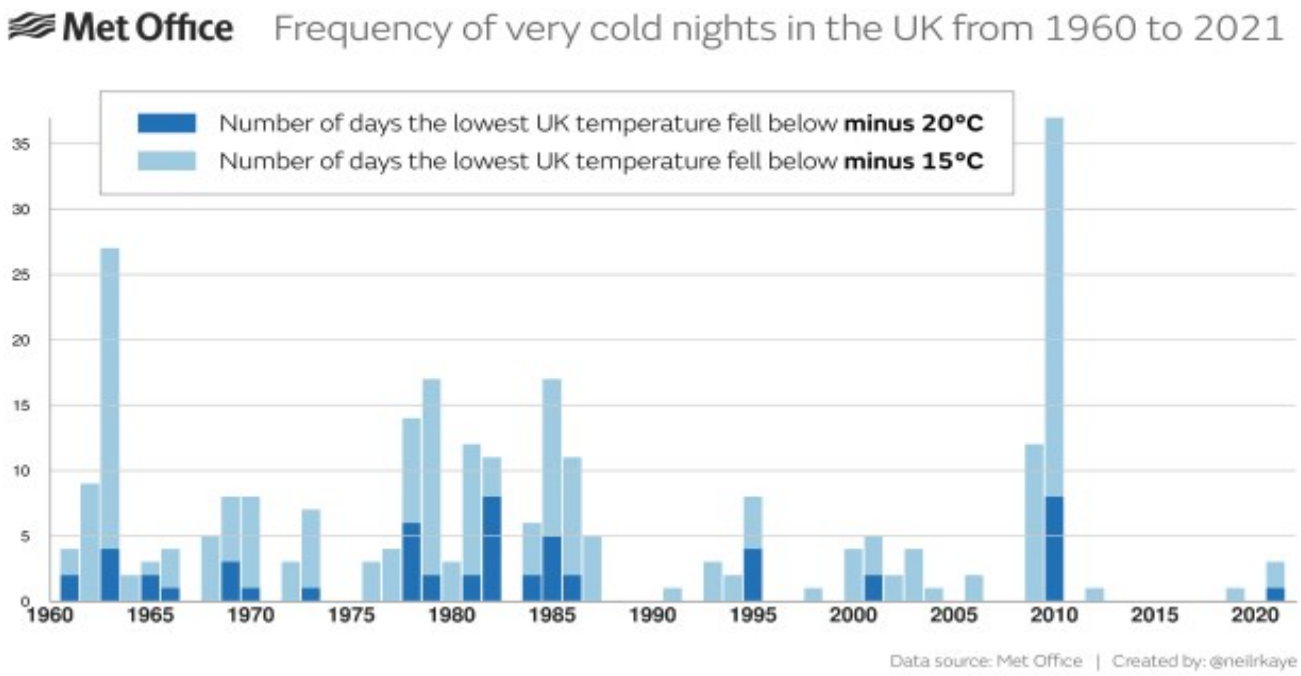
“Some of the differences in the forecast can be quite marginal depending on exactly the area in focus. For example, in Scotland you may have coastal communities lashed by heavy rain, whereas their inland and uphill neighbours may notice a marked change from heavy rain to snow. But all of these weather conditions present hazards, but communities rely on the Met Office to cope with the ever-changing and multi-hazard nature of winter weather and produce a forecast which helps to keep people safe.”

Date Created
February 2021

Record low temperature for the UK this millennium

Description

Overnight the recorded minimum temperature at the weather station at Braemar dropped to -23.0°C, one of three stations in the UK to dip below minus 20.0°C. With the media reporting on the ‘extreme’ conditions, we have analysed our records since 1961 for temperatures dropping below that threshold to observe the trend and to put last night’s records into a longer-term context.



Last night’s temperature at Braemar (11 February 2021) was the lowest recorded in the UK since 1995.

Minus 20.0°C is extreme cold. In fact it is even 2.0°C colder than the recommended temperature for the inside of a domestic freezer. So experiencing temperatures below -20.0°C in the UK are not common and not usually widespread.

Dr Mark McCarthy is the head of the National Climate Information Centre. He said: “The records from last night help to put the UK’s climate into context. For example, for all its roar, temperatures of below -20.0°C weren’t recorded during the Beast from the East during the end of February and the beginning of March 2018. But that event was certainly extreme by other measures, including widespread low daytime temperatures.

“Before this week we’d have to go back to December 2010 to see days where the UK temperature falls below minus 20.0°C. In that year eight days saw temperatures below that value.”

Since 1990, four years have recorded days below minus 20.0°C, but in the 30-year period up to 1990,

14 years reached that level.

Mark McCarthy added: “Temperatures of this level have always been extreme events in the UK, but what our records show is that these events have become less frequent. However, the UK’s climate record displays a huge range of natural variation and even though our climate has warmed by approximately 1.0°C, there is still the possibility of a severe cold-weather event: they’re just not as regular as they used to be.”

The lowest temperature recorded in the UK is -27.2°C on 30 December 1995, at Altnaharra; and on 10 January 1982, at Braemar.

From today temperatures are not expected to dip below minus 20.0°C as warmer conditions start to push in from the Atlantic reaching all parts of the UK by Monday.

Date Created
February 2021